

March 1991

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R&D

Research & Development

DEVELOPING 'GREEN' PRODUCTS

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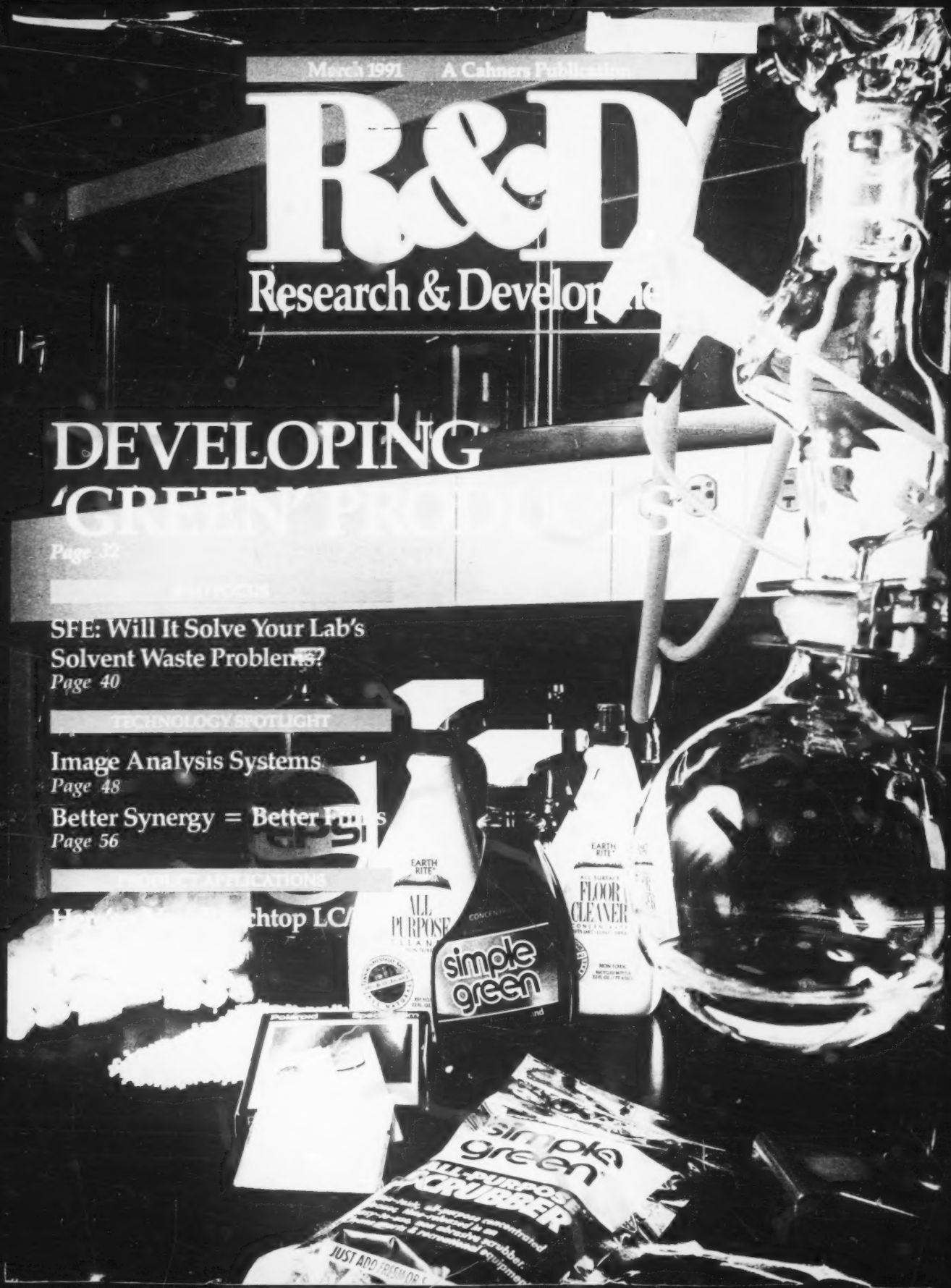
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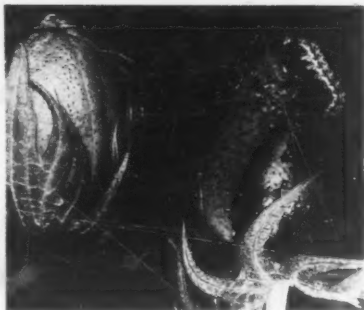
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ABOUT THE COVER These environmentally responsible products are evidence of a burgeoning "green" revolution. For more about this revolution and the mixed reviews it is receiving, turn to page 32. *Photo by Jack Grossman, Images Photographics Inc.; shot at Sandoz Crop Protection, Des Plaines, IL.*

R&D

The International Magazine of Research and Development

R&D FOCUS

Environmentally Safe Products: It's Not Easy Being Green 32

Smart companies are realizing that to be successful in the 1990s, you must develop products with the environment in mind.

SFE: Will It Solve Your Lab's Solvent Waste Problems? 40

Supercritical fluid extraction offers a nontoxic alternative to conventional techniques. Will it work for you?

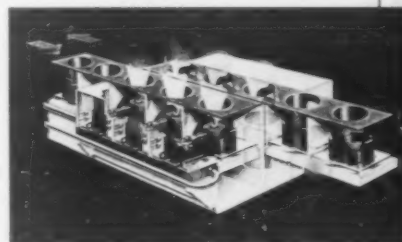
TECHNOLOGY SPOTLIGHT

Shop Like a Pro For Your Image Analysis System 48

Computer image analysis systems are getting more diverse every day. Here are today's trends, plus a dozen shopping tips.

Better Synergy = Better Films 56

The link between thin-film deposition processes and characterization methods creates stronger wear coatings and denser magnetic films.



Thin Films, page 56

PRODUCT APPLICATIONS

Here's a New Benchtop LC/MS 61

Compact size, low cost, and a particle beam interface on the mass spectrometer of this LC instrument make it more usable.

Sizing Particles With a Laser 63

This instrument can do particle size distribution analysis in a variety of difficult environments.

Now Contaminants Need Not Shut Down Your Cryocooler 66

Clog-resistant expansion nozzle in refrigeration systems improves the reliability of spacecraft instruments.

R&D BUSINESS

Instruments Continue Growth in 1991

Exports are expected to fuel most of the 3.7% total growth (in constant dollars) in laboratory instrument shipments in 1991, says the U.S. Dept. of Commerce (DOC) in its 1991 *U.S. Industrial Outlook*. This builds upon the 2.6% growth that instrument manufacturers experienced from 1989 to 1990.

This category includes analytical and optical instruments, laboratory apparatus, and mechanical testing equipment.

"The forecast is based on moderate economic growth in the U.S., increased industrial investments, and increased government R&D," says Lewis Podolske, an industry specialist at the DOC's Office of Microelectronics and Instrumentation, Washington, DC. The forecast takes into account the current U.S. recession, but was made before the January hostilities in Iraq.

Countries in the European Community were the main destination of U.S. instrument exporters, while imports from Japan exceeded exports to Japan by \$312 million. However, imports

from Japan actually dropped 6% in 1990 to \$1.01 billion from \$1.07 billion in 1989.

Most of the instrument growth is the result of continued growth in pharmaceutical, food processing, biotechnology, environmental monitoring, and materials research industries. More instruments are being sold to government labs with large research projects than to those with smaller programs, according to Podolske.

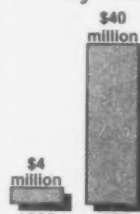
—Tim Studd

Diamond Business Getting Competitive

"The U.S. has pretty much followed [Japan] in the application of diamond-film technology for the past 10 years," says Edward Peters, a senior scientist at Arthur D. Little Inc., Cambridge, MA. "But within the past year, U.S. companies [have started] to move that technology forward."

There are several U.S. firms that now offer diamond coating services

SFE Growth Fueled By Cost Savings



Savings in analysis time and labor with supercritical fluid extraction (SFE) systems will cause this market to increase 10-fold by 1993 from its 1989 level, according to a forecast by Strategic Directions International Inc., a Los-Angeles-based management consulting firm.

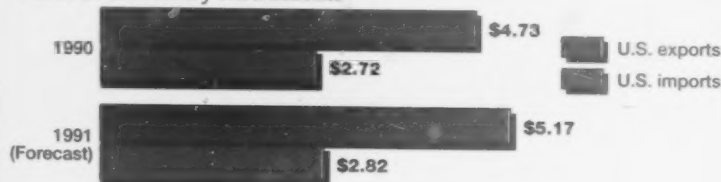
SFE is a sample-preparation technique that is used to isolate specific materials from its analyte through the use of supercritical fluids. For more on SFE, see article in this issue.

for other firms, so users can evaluate the advantages of diamond coatings on their own products without having to develop the coating process from scratch, says Peters. Most of these coating firms have been in business for several years and are associated with university research centers. □

Instrument Balance of Trade Increases

(in billions of U.S. dollars)

Value of laboratory instruments



Where instruments went and came from in 1990



Source: U.S. Dept. of Commerce

Exports of U.S. laboratory instruments will increase faster than imports in 1991, further boosting the already positive trade balance by more than \$300 million.

Lederman Calls for More R&D Funds

Low morale among academic researchers is a serious concern for U.S. long-term interests, says Leon Lederman, president-elect of the Washington, DC-based American Association for the Advancement of Science, in a recently completed survey of 250 university scientists.

"The source of the low morale appeared in letter after letter—lack of funding," says Lederman.

Lederman cites several reasons why there is less real dollar R&D support today than was available 20 years ago, including higher equipment costs, higher regulation costs, higher administrative costs, and Federal support that has not matched growth in the number of researchers.

Lederman proposes that doubling of Federal funding for academic research to \$10 billion would bring the U.S. to 1968 levels. □

Drug Firms Hit With New FDA Regulations

Facing increased pressures from several directions, U.S. pharmaceutical manufacturers have encountered yet another hurdle in their challenge to comply with new regulations from the Food and Drug Administration (FDA).

Last October, the FDA implemented a new pre-approval and inspection program to guarantee that generic and research-based drug companies are complying with Good Manufacturing Practices (GMP).

The goal of these New Drug Application guidelines is to assure that the bio-batch submitted with the application actually matches the products being manufactured.

"Hopefully, this new program will not result in any further delays in the approval of new drugs," says Jeff Trehwitt, spokesman for the Pharmaceutical Manufacturers Assn., Washington, DC.

Trehwitt says that in 1989, the aver-

age new drug application review time for brand-name drugs was 32.5 months. The average for 1990 was 27.7 months. "This is a step in the right direction, but still well above the six-month statutory standard," he says. "We would hate to see a setback at this crucial time."

Over the past five years, R&D costs have skyrocketed while the number of new drug approvals has remained constant, according to industry sources. On average, of 20 drugs entering the final testing stage, only one will be approved for market.

The high cost of bringing drugs to market, the need for increased automation in production, and the constraints in the laboratory environment all combine to impact severely on daily operations.

"The pharmaceutical industry is under increased regulatory pressure to certify that a company's analytical in-

Pharmaceutical Sales On the Rise Worldwide

(Total sales, in billions)



Source: Freedonia Group Inc.

Demand for medical products worldwide will grow 9% annually to more than \$235 billion by 1994, according to the Freedonia Group, Cleveland. Of this estimated total, pharmaceuticals will be \$152 billion.

struments, data systems, and laboratory information systems provide accurate and reliable results," says Laura Lauman, marketing manager for Perkin-Elmer Corp., Norwalk, CT.

The FDA is concerned with validation of methods to ensure that reproducible and reliable test results are obtained. The agency oversees the calibration of instruments, equipment logs and maintenance schedules, and documentation systems.

The agency is particularly concerned that pharmaceutical companies can show that data have not been altered. "We and other instrument makers are designing data storage systems to encode data and make it unavailable to the user in its primary state, so that it cannot be altered from that point on," says a spokesman for Shimadzu Scientific Instruments, Columbia, MD. "Everyone is attempting to follow Good Laboratory Practices. However, computers have not been around as long as other equipment, and software is still evolving to deal with this situation."

—Howard Goldner

Technicians at Genentech assemble final packaging and apply labeling to pharmaceutical products.



SOFTWARE

Data Visualization

Dynamic data visualization and management on a new, higher level of complexity is possible with Data Views release 8.0 for all major UNIX and VMS workstations. Added features include image rotation, scaling, and motion along a path.
V.I. Corp. **Circle 453**

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Derive version 2.0 is a productivity tool for use with DOS 2.1 or later by scientists, engineers, and educators.

An expert system, it combines computer algebra with a menu-driven interface to solve a wide range of complex math problems.
Soft Warehouse **Circle 454**

Elastomer Selection Guide

The "3M Elastomer Selection and Design Guide" is specifically intended to help design and materials engineers and rubber processors choose the best elastomers or fluoropolymers for specific applications. Available in 5.25-in. or 3.5-in. disk formats, the easy-to-use, menu-driven program requires little computer skill.
3M Co. **Circle 447**

ABP 

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